ENTOMOLOGICAL NEWS

JULY 1960

Vol. LXXI **No. 7**

CONTENTS

Evans—Further studies on Xenopompilus 165

Emerson—A new Mallophaga from the barred owl 169

Kempf—Tranopeltoides a synonym of Crematogaster 173

McComb—Two new Aphaereta, with key to species 175

Laboratory refresher courses 178

Slifer—Method for permeable areas in body wall 179

Scott—Collembola of N. Mexico. II. Neanurinae 183

Obituaries 191

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada.
Second-class postage paid at Lancaster, Pa.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: H. J. GRANT, JR., E. J. F. MARX, M. E. PHILLIPS, and J. A. G. REHN.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

Prices per yearly volume of 10 numbers.

Private subscriptions, for personal use: in the United States, $5.00; Canada, $5.15; other countries, $5.30.

Institutional subscriptions, for libraries, laboratories, etc.: in the United States, $6.00; Canada, $6.15; other countries, $6.30.

ADVERTISEMENTS: Rate schedules available from the editor.

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. Articles longer than eight printed pages may be published in two or more installments, unless the author is willing to pay the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS: Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus printing. Size limit, when printed, 4 × 6 inches. All blocks will be sent to authors after printing.

TABLES: The cost of setting tables will be charged to authors.

SEPARATA: Members of the American Entomological Society may elect to receive, gratis, 25 offprints of their contributions. These will be "run-of-form," without removal of extraneous matter.

Those members desiring more than 25 separates, and all non-members, will receive no gratis copies. They must obtain all their separates (as reprints, with extraneous matter removed) from the printer at the prices quoted below. Authors must place their order for such separates with the editor at the time of submitting manuscripts, or when returning proof.

Copies	1–4 pp.	5–8 pp.	9–12 pp.	13–16 pp.	17–20 pp.	Covers
50	$3.95	$6.33	$ 9.89	$10.28	$13.44	$4.31
100	4.74	7.51	11.86	12.65	16.21	5.89
Add'l 100	1.58	2.36	3.94	4.74	5.54	3.16

Plates printed one side: First 50, $3.15; Additional 100's, $2.37.

Transportation charges will be extra.

ENTOMOLOGICAL NEWS

VOL. LXXI JULY, 1960 No. 7

Further Studies on the Subgenus Xenopompilus, Including a First Record of this Group from the United States (Hymenoptera: Pompilidae)

By HOWARD E. EVANS, Cornell University, Ithaca, N. Y.

In 1953 I described *Xenopompilus* as a new subgenus of *Pompilus,* pointing out that it possessed a number of unusual structural features apparently relating it to primitive Pompilini (Ann. Ent. Soc. Amer., 46: 531–537). My study of this group was based on six females and one male from five states of central and northern Mexico. During 1959, receipt of a fellowship from the John Simon Guggenheim Memorial Foundation made it possible for me to spend several months in Mexico and six weeks at the Southwestern Research Station, near Portal, Arizona. I found wasps of this subgenus to be not uncommon in certain places, and I was able to collect 60 specimens. The present paper is a brief report on this collection.

The results of this study may be summarized as follows. First, the subgenus can now be considered a member of the fauna of the United States, for I took two males in southeastern Arizona of a species which is beyond question *tlahuicanus,* described from Morelos. Discovery of this species from a locality north of the range of *tarahumarae,* and also from Jalisco, has led me to study the available specimens with respect to the characters supposed to separate *tlahuicanus* and *tarahumarae.* This has led me to a second conclusion: that these two names are in fact synonyms. Third, the male of the other species of this subgenus, *tarascanus,* has been discovered. Since my subgeneric description was based on a single male *tlahui-*

canus, it must now be broadened somewhat to accommodate *tarascanus.* A description of the male of this species, with figures of the terminalia, is therefore included in this paper.

Pompilus (Xenopompilus) tlahuicanus Evans

Pompilus (*Xenopompilus*) *tlahuicanus* Evans, 1953, Ann. Ent. Soc. Amer., 46: 534. (♂, ♀, Morelos.)

Pompilus (*Xenopompilus*) *tarahumarae* Evans, 1953, ibid., p. 535. (♀, Durango, Chihuahua.) New synonymy.

The twenty-five females now available to me range in size from 6.5 to 9.2 mm., the fore wing from 5.1 to 7.5 mm. The front femora vary from 3.7 to 4.0 times as long as thick. Transverse rugae are evident on the posterior slope of the propodeum of all specimens, but they are often very weak. The postnotum shows much variation in the details of the sculpturing and cannot be used for separating *tlahuicanus* and *tarahumarae* as first supposed. In the specimens from Durango and Chihuahua the third antennal segment is relatively somewhat longer, 1.15–1.16 times the fourth segment, .79–.80 times the distance between the eyes at the top. In specimens from Jalisco and Morelos the third antennal segment is from 1.03–1.13 times the fourth (average 1.08), from .64 to .75 times the distance between the eyes at the top (average .70). This small difference hardly seems sufficient to justify specific status for *tarahumarae,* particularly since a male *tlahuicanus* has recently been taken north of the supposed range of *tarahumarae.*

The twenty-eight males now available range in size from 3.8 to 7.8 mm., the fore wing from 4.0 to 6.2 mm. In the series from Morelos, the apical fuscous band on the fore wing varies from dark to virtually absent; in the Arizona specimens the band is intermediate in intensity. The Arizona specimens agree very closely with those from Morelos, even to details of the male terminalia.

Material examined.—MORELOS: 1 ♀, 1 ♂, Alpuyeca, 27 June 1951 (P. D. Hurd); 14 ♀♀, 21 ♂♂, 2 mi. S. Alpuyeca, 14 May–19 June 1959, 3,000 feet elev. (H. E. Evans); 1 ♀, 1 ♂, Cuernavaca, 2 April 1959, 26 June 1951, 5,500 feet elev. (H. E.

Evans); 2 ♀♀, 1 ♂, 3–6 mi. S. Cuernavaca, 1–17 April 1959, 4,000–5,000 feet elev. (H. E. Evans), 3 ♀♀, 2 ♂♂, 3 mi. NW Cuernavaca, 27 May–3 June 1959, 6,500 feet elev., on honeydew (H. E. Evans); JALISCO: 2 ♀♀, Guadalajara, 13 July 1959, 5,000 feet elev., on *Baccharis* (H. E. Evans); DURANGO: 1 ♀, 10 km. N. Nombre de Dios, 5 Aug. 1951, on *Baccharis* (H. E. Evans); CHIHUAHUA: 1 ♀, 25 km. S. Chihuahua, 11 Aug. 1951, on *Baccharis* (H. E. Evans); ARIZONA: 2 ♂♂, Southwestern Research Station, 5 mi. W. Portal, Cochise Co., 5,400 feet elev., on honeydew on *Populus*, 9–12 Sept. 1959 (H. E. Evans).

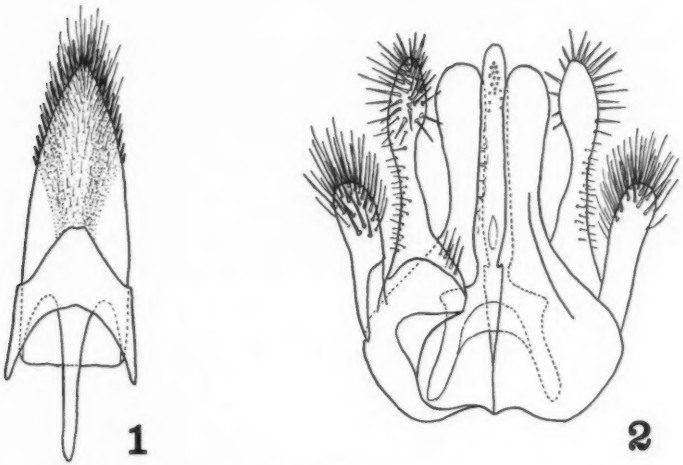


FIG. 1. *Pompilus* (*Xenopompilus*) *tarascanus* Evans, male subgenital plate, ventral aspect. FIG. 2. Same species, male genitalia, ventral aspect on left side, dorsal on right.

Pompilus (Xenopompilus) tarascanus Evans

Pompilus (*Xenopompilus*) *tarascanus* Evans, 1953, Ann. Ent. Soc. Amer., 46: 536. (♀, Michoacan and state of Mexico.)

Twelve specimens, six of each sex, are now available to me. The females vary in length from 5.5 to 8 mm., the fore wing from 4.9 to 7 mm. The third antennal segment varies from

.55 to .63 times the distance between the eyes at the top. As noted in the original description, the front femora are slightly incrassate, measuring slightly more than three times as long as thick.

Description of male.—Length 4.5 to 6.2 mm.; fore wing 4.3 to 5.7 mm. Body black; apical abdominal tergite with a large white spot. Pubescence reflecting dark blue over much of the body, but distinctly silvery on the lower front, temples, pronotum, pleura, coxae, and posterior slope of propodeum. Front, vertex, pronotum, mesoscutum, and scutellum with conspicuous dark setae. Wings hyaline, the fore wing with a narrow fuscous band apically. Clypeus about twice as broad as high, its apical margin straight, the labrum well exserted beyond it. First four antennal segments in a ratio of about 18:9:12:13, segment three only 1.3 times as long as thick. Ocelli in a broad triangle, postocellar line slightly exceeding ocello-ocular line. Posterior margin of pronotum arcuate, with a weak median angulation. Postnotum slightly shorter than metanotum, with some weak transverse striations. Third submarginal cell small, triangular or nearly so, in one specimen short-petiolate above. Subgenital plate narrow, acute apically, its margin clothed with stout spines (fig. 1). Genitalia with the aedoeagus slender throughout; parapenial lobes thick, with a small sub-basal notch on the inner margin; volsellae slender, slightly expanded apically, the expanded portion clothed with heavy, dark setae; parameres short, club-shaped, clothed apically with long, heavy setae (fig. 2).

Material examined.—MICHOACAN: 1 ♀, 5 km. W. Zacapu, 13 July 1951 (P. D. Hurd); MORELOS: 1 ♀, Cuernavaca, 16 May 1959, 5,500 feet elev. (M. A. Evans); MEXICO: 4 ♀♀, 6 ♂♂, Teotihuacan Pyramids, 15 June 1951, 3 July 1959, 7,500 feet elev. (H. E. & M. A. Evans).

The differences between the two known species of *Xenopompilus* may be summarized as follows:

Labrum barely if at all exserted beyond the apical margin of the clypeus; pronotum, mesonotum, and scutellum with only a few short, inconspicuous setae. Female: front femora not incrassate; clypeus about 2.7 times as broad as high, its apical

margin with a narrowly elevated rim; third antennal segment slightly longer than the fourth and equal to from .64 to .80 times the distance between the eyes at the top. Male: subgenital plate moderately broad, tapering to a subacute apex, its margin with weak setae; aedoeagus slightly expanded apically; volsellae with short setae; parameres subacute, with long setae on the inner margin.....*tlahuicanus* Evans

Labrum well exserted beyond the apical margin of the clypeus; pronotum, mesonotum, and scutellum with numerous strong, dark setae. Female: clypeus about 2.2 times as broad as high, its apical margin without an elevated rim; third antennal segment not longer than the fourth, equal to only from .55 to .63 times the distance between the eyes at the top; front femora slightly incrassate. Male: subgenital plate slender, its apical margin fringed with very heavy setae; aedoeagus slender; volsellae with very strong setae; parameres club-shaped, with many strong setae.....*tarascanus* Evans

---

A New Species of Mallophaga from the Barred Owl

By K. C. Emerson, Stillwater, Oklahoma

The amblyceran genus *Kurodaia* Uchida, 1926, is found in North America on avian hosts of the orders Falconiformes (Hawks) and Strigiformes (Owls). The subgenus *Kurodaia* contains forms found on the Falconiformes. All known North American species of this subgenus possess three combs of short setae on the ventor of the third coxae. The subgenus *Conciella,* Eichler, 1949, contains the forms found on the Strigiformes. All known North American species of this subgenus possess four combs of short setae on the ventor of the third coxae.

Kurodaia (Conciella) magna n. sp.

Male. General shape and chaetotaxy as shown in fig. 2. Male genitalia, less the genital sac, as shown in fig. 3. The genital sac is armed with prominent teeth.

Female. General shape and chaetotaxy as shown in fig. 1.

Type host. Strix varia Barton, Barred Owl.

Type material. Holotype male, *allotype* female, and eight *paratypes* collected at Nacogdoches, TEXAS, on January 9, 1953. Two paratypes collected at Corvallis, Oregon, date unknown. Two paratypes collected at Fairhope, Alabama, on August 31, 1930 by Mrs. W. H. Edwards. Two paratypes collected at Bainbridge, Georgia on June 16, 1956 by S. M. McKeever. Holotype male and allotype female have been deposited in the U. S. National Museum.

Discussion. The specimens from Texas and Oregon have the expanded preantennal region of the forehead as shown in figs. 1 and 2. This expansion is not as great in the other specimens. This expansion is distinctive and not found in other known species of the genus. However, since it can not be determined how much this expansion has been influenced by mounting, the character has not been used in a key to separate the known North American species of the subgenus. *K. magna* is closest to *K. painei,* but is considerably larger than *K. painei.* The following key indicates other differences.

Key to North American *Kurodaia* (*Conciella*) Found on Owls

1. Abdominal tergites I–VI each with one row of setae.....2
   Abdominal tergites I–VI each with two rows of setae.....4
2. Two combs of short setae in the posterior-lateral angles of third abdominal sternite; these combs approximately equal in size, each with about 12 short setae.....*pectinata*
   The posterior comb in the posterior-lateral angles of third abdominal sternite with about 14 short setae, the anterior comb with about 7 short setae.....3
3. Posterior margin of eighth abdominal sternite of female (vulva) with approximately 16 medium-length setae..*painei*
   Posterior margin of eighth abdominal sternite of female (vulva) with approximately 28 medium-length setae..*magna*
4. Posterior margin of eighth abdominal tergite of female with 4 long and 8 medium-length setae.....5
   Posterior margin of eighth abdominal tergite of female with 6 long and 4 medium-length setae.....*menoponoides*
5. Posterior margin of eighth abdominal sternite of female (vulva) with approximately 16 medium-length setae. Four

All figures refer to *Kurodaia* (*Conciella*) *magna* n. sp. Figures 1 and 2 drawn to the same scale. Fig. 1. Dorsal-ventral view of female. Fig. 2. Dorsal-ventral view of male. Fig. 3. Male genitalia.

combs on third coxae with 3–4, 6–7, 7–8, and 7–8 short spines respectively.....*subpachygaster*
Posterior margin of eighth abdominal sternite of female (vulva) with approximately 20 medium-length setae. Four combs on third coxae with 5–6, 6–7, 8–9, and 7–8 short spines respectively.....*brachysoma*

Type hosts of North American *Kurodaia* (*Conciella*)

K. brachysoma (Kellogg and Chapman, 1902)—*Asio flammeus* (Pontoppidan), Short-eared Owl.
K. magna n. sp.—*Strix varia* Barton, Barred Owl.
K. menoponoides (Ewing, 1930)—*Nyctea scandiaca* (Linnaeus), Snowy Owl.
K. painei (McGregor, 1912)—*Otus asio* (Linnaeus), Screech Owl.
K. pectinata (Osborn, 1902)—*Speotyto cunicularia* (Molina), Burrowing Owl.
K. subpachygaster (Piaget, 1880)—*Tyto alba* (Scopoli), Barn Owl.

In this study, types of all species except *K. subpachygaster* were examined and type hosts confirmed with other material from these hosts.

References

Eichler, W. 1949. Boll. Soc. Ent. Ital., 79: 11–13.
Ewing, H. E. 1930. Proc. Ent. Soc. Wash., 32: 117–121.
Kellogg, V. L. and B. L. Chapman. 1902. Jour. N. Y. Ent. Soc., 10: 155–169.
McGgegor, E. A. 1912. Ent. News, 23: 305–306.
Osborn, H. 1902. Ohio Nat., 2: 201–204.
Piaget, E. 1880. Les Pediculines. Leiden.
Uchida, S. 1926. Jour. College of Agri., Imper. Univ. Tokyo, 9: 1–56.

Tranopeltoides Wheeler, a Synonym of Crematogaster Lund (Hymenoptera: Formicidae)

By WALTER W. KEMPF, O.F.M., São Paulo, Brazil

In 1922, the late Prof. W. M. Wheeler erected the Myrmecine ant genus *Tranopeltoides* upon the description of a damaged female, proposed earlier (1907) by Forel as *Tranopelta huberi.* In the same paper, Wheeler also described three additional species in the genus *Tranopeltoides: parvispina* upon a lone, mutilated female, *bolivianus,* and *peruvianus* each upon a single stray male specimen.

Upon carefully examining the group characters that separate the aforesaid species from *Tranopelta,* it was found that precisely the same distinctive features place them within the genus *Crematogaster,* of which *Tranopeltoides* becomes thus a new synonym. Details of the findings are discussed below under each species.

CREMATOGASTER Lund

Crematogaster Lund, 1831, Ann. Sci. Nat., 23: 132. Type: *Formica scutellaris* Olivier, 1791, by designation of Bingham, 1903.

Tranopeltoides Wheeler, 1922, Amer. Mus. Novit. n. 48, pp. 10–11. Type: *Tranopelta huberi* Forel, 1907, by original designation. NEW SYNONYMY.

Crematogaster huberi (Forel), new combination.

Tranopelta huberi Forel, 1907, Mitt. Naturhist. Mus. Hamburg, 24: 5 (female; Surinam).

Tranopeltoides huberi, Wheeler, 1922, Amer. Mus. Novit. n. 48, p. 11.

Neither Wheeler nor I have seen the holotype female of this species, which was already lacking the gaster when Forel first described her in 1907. Due to the fragmentary condition of the specimen it was, of course, impossible to ascertain whether the postpetiole articulated to the dorsal surface (the most obvious feature of *Crematogaster*) or at the anterior end of the gaster (the common condition in the subfamily Myrmicinae). Still,

two other characters contained in the original diagnosis, *viz.*, the presence of two epinotal spines and the peculiar shape of the petiolar node ("anterior slope of petiolar node gently rising antero-posteriorly in the form of a gradual inclined plane, broad behind, with convex sides, longer than broad, posteriorly with two blunt, tooth-like corners"—transl. by Wheeler, 1922) show that this damaged queen is doubtless a *Crematogaster*.

The species probably belongs to the *limata*-group and may represent a form already known under a different name in the worker caste. On account of the small size, the smooth mandibles and the longer scapes it is certainly not the female of *stolli*.

Crematogaster stolli Forel

Crematogaster stolli Forel, 1884, Bull. Soc. Vaud. Sci. Nat., 20: 373–375 (worker; Guatemala: Retaluleu).
Tranopeltoides parvispina Wheeler, 1922, Amer. Mus. Novit. n. 48, pp. 12–13, fig. 3 d (female: British Guiana: Kaieteur). NEW SYNONYMY.

Tranopeltoides parvispina is nothing but the huge female of *Crematogaster stolli*. Dr. W. L. Brown, Jr., of the Museum of Comparative Zoology at Harvard University, kindly compared authentic *stolli* females, which I had sent him, with the *parvispina* holotype. Besides the more faded color of the latter specimen, he found no other noticeable difference. Wheeler, like Forel in the case of *huberi*, erred in the determination of the genus because his specimen lacked the postpetiole and gaster, on which the most striking *Crematogaster* characters can be found.

Crematogaster boliviana (Wheeler), new combination

Tranopeltoides bolivianus Wheeler, 1922, Amer. Mus. Novit. n. 48, pp. 13–14, fig. 3 a, b, c (male; Bolivia: San Firmino).

Two stray *Crematogaster* males from Anicohy and Amapari rivers, Amapá Territory, Brazil, collected by Prof. John Lane and deposited in my collection, completely agree with the description and figures of *bolivianus* and show that Wheeler, once more, failed to recognize the correct genus. Dr. Brown, at my

request, examined the type specimen and confirmed my suspicion. Due to its relatively large size, this specimen probably represents the still undescribed male of *stolli*.

Crematogaster peruviana (Wheeler), new combination

Tranopeltoides peruvianus Wheeler, 1922, Amer. Mus. Novit. n. 48, p. 14 (male; Peru: Callanga).

This species, also based on a single stray male, differs from the preceding species only in trivial characters. According to Dr. Brown (personal communication) "the differences between these forms listed by Wheeler either do not exist on the specimens at all, or else they are inconsequential. The antennal difference, which he emphasized, is incorrectly stated: the third through sixth funicular segments are about as long in *peruvianus* as in *bolivianus*, but in *peruvianus* they are a little thicker. If Wheeler had actually measured the segments, he would have seen this." I likewise suspect that this species is merely a variant of the former, both representing the male sex of *stolli*. The formal synonymy, however, must needs be based on better material, presently not available to me.

Two New Species of Aphaereta, with a Key to the Nearctic Species (Hymenoptera: Braconidae) [1]

By C. W. McComb, University of Maryland, College Park, Md.

Two additional series of *Aphaereta* have been brought to my attention since publication of my redescription of *Aphaereta pallipes* (Say), (McComb, 1958). These forms are described as new species below. I wish to express my appreciation to Mr. C. F. W. Muesebeck for his review of this work and to the United States National Museum and the Canada Department of Agriculture for the loan of material for this study.

[1] Scientific Article No. A823, Contribution No. 3103 of the Maryland Agriculture Experiment Station, Department of Entomology.

Key to the Nearctic Species of *Aphaereta*

1. Thorax and abdomen testaceous; second flagellar segment barely longer than first; mesopleural furrow not distinct; male subapterous.....*excavata,* new species
   Entire body black or blackish except for first abdominal segment which may be light in color; mesopleural furrow well impressed and foveolate; second flagellar segment much longer than first; males fully winged.....2
2. Ovipositor sheath longer than hind tibia; first flagellar segment uniformly dark throughout.....*pallipes* (Say)
   Ovipositor sheath shorter than hind femur; first flagellar segment dark at apical end, but gradually turning light toward the base.....*masoni,* new species

Aphaereta excavata, new species

This species is distinguished especially by the unusually deep excavation on each side of the scutellum, by the prominent spiracular tubercles of the first abdominal segment, by the relatively short second segment of antennal flagellum, by the unusually short ovipositor sheath which is not longer than the first tergite, by the testaceous color and by the male being subapterous.

Female. Length 1.6–2.6 mm.; head transverse, strongly excavated behind; face thickly covered by erect hair and with a conspicuous median fovea directly below the antennae; eye completely bare, broadly oval, its greatest diameter about equal to half the width of face, temple a little narrower than eye but strongly convex; a distinct, complete, grooved line extending from anterior ocellus backward across vertex and occiput; antenna with 21 to 23 segments, distinctly tapering apically, unusually thickly hairy especially on the basal flagellar segments; first segment of flagellum barely shorter than the second, the latter distinctly broadening toward apex and considerably longer than third segment; most of the flagellar segments not, or barely, twice as long as thick.

Thorax compact; notauli indicated at anterior margin of mesoscutum, median lobe of mesoscutum indicated by weakly raised lines extending backward from the short impressions representing the notauli; sides of scutellum exceedingly strongly

excavated with the result that the basal lateral areas are completely hollowed out beneath and the disc of the scutellum is small and nearly parallel-sided; scutellar fovea large but shallow; propodeum rugulose; mesopleuron smooth and shining, the furrow weak and not distinctly foveolate; metapleuron smooth.

Wings with second cubital cell strongly narrowed outwardly, the second intercubitus being less than half as long as the first.

Abdomen slightly longer than thorax, and about as broad; spiracular tubercles of first segment slightly before the middle, unusually prominent; first tergite weakly, irregularly, longitudinally acciculate, and with two posteriorly convergent keels not quite attaining apical margin; remainder of abdomen smooth; ovipositor sheath equal to length of first tergite.

Testaceous; head black or piceous, scape and pedicel yellowish, flagellum dark brown, paler apically, legs entirely yellow except the hind tibiae which are faintly dusky from slightly beyond base to a little beyond the middle. Wings hyaline.

Male. Very similar to female except for the antennae being 20-segmented in material examined, and in the greatly abbreviated wings, the anterior wings not attaining middle of abdomen.

Type locality. Somerville, GEORGIA.

Type. U. S. Nat. Mus. No. 64911.

Host. *Sarcophaga* sp. on *Sarracenia flava.*

Described from 31 females and 11 males reared by F. M. Jones, July and August 1915. Most of the males are in poor condition.

Aphaereta masoni, new species

This species resembles *excavata* in its very short ovipositor which is shorter than the hind femur, but it differs conspicuously in having its thorax and abdomen black and in its more slender antennae. In color and antennal structure it closely resembles *pallipes,* from which it may be distinguished by its much shorter ovipositor, and the largely pale first flagellar segment.

Female. Length 1.9 and 2.0 mm.; face twice as broad as high, convex, smooth, and polished; eyes round with several

distinct hairs present; temples convex, narrower than the eyes; antennae with 22–24 segments, filiform, with the first segment much shorter than the second, the rest progressively a little shorter toward apex of antenna, even the shortest segments at least twice as long as thick; back of head smooth, polished, with a line running caudad from the median ocellus to the neck.

Mesoscutum smooth and highly polished: scutellar fovea large, shallow and divided into two parts by a median, longitudinal raised line; scutellum broadly rounded at apex, highly polished; mesopleuron shiny and with a foveate furrow; propodeum rugose. Wing with the second cubital cell gradually narrowed outwardly, almost three times as long as its greatest width.

Abdomen smooth, polished; equal in length to thorax, the first tergite longitudinally rugulose striate. Ovipositor sheath shorter than hind femur and only half as long as hind tibia.

Color uniform black with exception of scape, pedicel and legs, which are lighter.

Male. Like the female except that the number of segments in the antennae of material examined ranges from 24 to 26.

Type locality. Stratford, ONTARIO, Canada.

Type. In the Canadian National Collection at Ottawa.

Host. Cordilura sp. (of dipterous family Scatomyzidae). Described from 21 females and 3 males reared by J. R. Vockeroth of the Entomology Division, Canada Department of Agriculture.

LITERATURE CITED

McCOMB, C. W. 1958. New synonymy in the genus *Aphaereta* with a redescription of *Aphaereta pallipes* Say. Proc. Ent. Soc. Wash., 60: 223–224.

Laboratory Refresher Training Courses

The Public Health Service, Communicable Disease Center, Atlanta, Ga. will give 22 courses in microbiological subjects, Oct. 10 to Apr. 7, each lasting from one to four weeks.

A Rapid and Sensitive Method for Identifying Permeable Areas in the Body Wall of Insects

By Eleanor H. Slifer, Department of Zoology,
State University of Iowa, Iowa City, Iowa

In 1954 the writer found that the tips of the long, thick-walled sensory pegs on the antennae and other parts of the grasshopper were permeable to acid fuchsin in aqueous solution when this was applied to the external surface of the living insect. The method as first described was altered in later papers (Slifer, 1955a, 1955b) but several difficulties remained. The dye was sometimes lost during dehydration of the part being studied either to the external solutions or to the fluids inside the sense organs. The faint pink color of small amounts of the dye was poorly visible against the natural yellow or pale brown of the unstained cuticle. Certain sense organs which, as other evidence indicated, were almost certainly provided with permeable regions, could not be shown to stain. The method described here avoids these difficulties. No dehydrating agents are used and the only clearing agent used is xylol. Rapid diffusion of the dye is prevented by using fixed material and the purple color of the dye selected is one rarely, if ever, encountered in insect cuticle.

The specimens to be examined should be clean and uninjured. Although insects caught outdoors may be used the presence of dust, pollen and other debris on their surface will make study more difficult, especially for the beginner, since these foreign materials will also stain. If broken hairs or other damaged spots are present dye will enter through these. Another source of trouble is food regurgitated by the insect during handling or fixation. This sometimes adheres to the outer surface of the body and attempts to remove it later may break hairs or abrade the cuticle. Insects which have completed the final stages of their development in the laboratory and have been isolated in clean containers are most satisfactory although even here dried residue from the molting fluid may cause confusion since it, too, will stain. However, after the investigator has gained experi-

ence by studying clean, undamaged specimens the interpretation of material which is less perfect presents few hazards.

The insect to be studied should be anesthetized very lightly with CO_2, KCN or some other agent which will not affect cuticular waxes. As soon as the insect is quiet it is dropped whole into Bouin's solution or a 10% solution of formalin and allowed to remain there for 24 hours or longer. The anaesthetic prevents the insect from struggling and damaging itself when placed in the fixative. After fixation is complete the specimen is washed well and placed entire, if it is a small one, in a 0.5% solution of crystal violet. If the insect is large the desired part—antenna, leg, head, etc.—may be removed and placed between layers of glass cloth or cotton gauze in such a way that the cut end protrudes from between the layers. Dye is then added cautiously until the cloth is saturated with it but none is permitted to reach the cut surface of the part being stained. Such preparations should be kept in a moist chamber for if water is lost crystals of dye may form on the surface of the specimen and cause trouble later.

The optimum time for staining must be determined for each new species studied. Five minutes in the dye is sufficient for some of the more delicate forms while two hours, or even longer, may be required for others. If several individuals of the same species are placed in the stain together one may be removed after five minutes and the others after 15, 30, 60 and 120 minutes—or earlier if the first specimens show good staining. If left too long in the stain all of the internal tissues as well as the inner layers of the cuticle will be colored deep purple and no information will be gained concerning sites of penetration.

Upon removal from the dye the specimen is dipped very quickly into two changes of distilled water and laid at once on a piece of absorbent paper on the stage of the dissecting microscope. The insect is moved immediately to a dry spot on the paper and the antennae, legs, mouthparts or other region of special interest cut off and moved away to dry as quickly as possible. The use of a 100 or 150 watt electric lamp to illuminate the stage is convenient for it provides heat to hasten drying.

The pieces are watched under the microscope and a few moments after all surface moisture has disappeared each specimen is transferred to a dish of xylol and left there until it clears. If the part is small it will clear within an hour or two and may then be mounted permanently on a slide in resin. If clearing proceeds very slowly the piece may be removed, drained quickly on absorbent paper and returned to xylol. While in xylol the

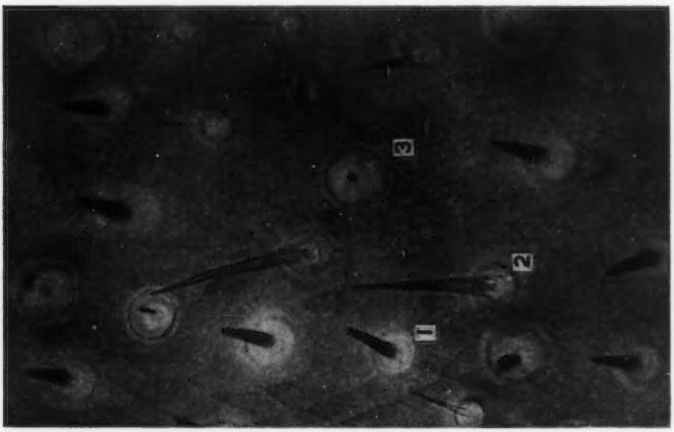


FIG. 1. Whole mount of small portion of surface of antennal flagellum of *Melanoplus differentialis* (Thomas) showing three types of chemoreceptors: 1, thin-walled basiconic pegs; 2, thick-walled basiconic pegs; 3, coeloconic pegs. Stained with crystal violet applied to *external* surface of intact antenna. × 560.

parts may be dissected if desired. This is best done at once before the material becomes hard and brittle. A grasshopper antenna, for example, may be cut into four or five pieces and each of these split lengthwise so that the cellular contents can be lifted out and discarded. When mounted external surface up in resin such pieces show the stained areas of the sense organs in sharp contrast against the clear, pale yellow, unstained cuticle (fig. 1). A series of such preparations stained for different periods of time will show not only the point at which the stain first penetrates but also its later progress from

that region. Each slide should be examined immediately since well-stained structures may lose their color within hours or days if any water remains in the tissue.

The method just described stains clearly all of the sense organs on the antennal flagellum of the grasshopper which earlier work had shown to be permeable in the living insect as well as those which other evidence obtained with the electron microscope (Slifer, Prestage and Beams, 1957, 1959) had indicated must also be permeable. A preliminary survey of antennae of species from all of the major insect orders has shown that they, too, possess sense organs which stain when crystal violet is applied to the external surface as described in this paper. Further work on these is in progress.

Summary

Whole insects, or their parts, which have been fixed in formalin can be stained with a solution of crystal violet applied to the *external* surface. Permanent preparations are made by drying small pieces of the body wall briefly in air, clearing in xylol and mounting in resin. The cuticle, itself, if uninjured, does not stain but dye enters at each of those points where any part of a tissue or cell is exposed. The technique is especially helpful in locating the distal tips of the neurones of chemoreceptors.

References

Slifer, E. H. 1954. The permeability of the sensory pegs on the antennae of the grasshopper (Orthoptera, Acrididae). Biol. Bull. 106: 122–128.

——. 1955a. The distribution of permeable sensory pegs on the body of the grasshopper (Orthoptera: Acrididae). Entomol. News 66: 1–5.

——. 1955b. The detection of odors and water vapor by grasshoppers (Orthoptera, Acrididae) and some new evidence concerning the sense organs which may be involved. Jour. Exp. Zool. 130: 301–317.

——, J. J. Prestage and H. W. Beams. 1957. The fine structure of the long basiconic sensory pegs of the grasshopper (Orthoptera, Acrididae) with special reference to those on the antenna. Jour. Morph. 101: 359–397.

——, ——, ——. 1959. The chemoreceptors and other sense organs on the antennal flagellum of the grasshopper (Orthoptera; Acrididae). Jour. Morph. 105: 145–191.

The Collembola of New Mexico. II. Neanurinae[1, 2]

By Harold George Scott [3]

Thirteen species of springtail insects are recorded in this part. None has been reported previously from New Mexico.

Subfamily Neanurinae Borner, 1901

Head prognathous; mouthparts suctorial; pseudocelli absent; anal spines, postantennal organ, and furcula present or absent.

Tribe *Pseudachorutini* Borner, 1906

Anal segment small; supra-anal valve rounded; segmental tubercles absent; buccal cone present or absent.

Genus **Pseudachorutes** Tullberg, 1871

Mouthparts projecting in a cone; eyes 8 and 8; postantennal organ, when present, with 6–20 tubercles; unguiculus and anal spines absent; furcula present.

Pseudachorutes aureofasciatus (Harvey, 1898).

New Mexico Records. From Berlese of (1) clumps of dead yucca and soil around roots, 6,100 ft., 13 mi. S of Lamy, Santa Fe Co., 30–vii–1953; (2) mesquite litter, 4,800 ft., 18 mi. N of Socorro, Socorro Co., 24–vii–1954.

Distribution. Iowa, Maine, N. M., N. Y.

Pseudachorutes subcrassoides Mills, 1934.

New Mexico Records. Taken 6 times from beneath logs or litter (oak, yellow pine, aspen, spruce, fir, juniper); 7,400 to

[1] A portion of a dissertation submitted to the Graduate Faculty of the University of New Mexico, Albuquerque, in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

[2] Part I, Ent. News, **71**: 53-62; associated articles, Ent. News, 69(8): 202, and 70(1): 13–16.

[3] Training Branch, Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Georgia.

9,000 ft.; Rio Arriba, Sandoval, Santa Fe, San Miguel, and Bernalillo Co.; May–Sept., 1951–1953.

DISTRIBUTION. Iowa, N. M., N. Y.

Genus **Friesea** Dalla Torre, 1895

Furcula present, not reaching collophore; eyes 5 and 5 or 8 and 8; postantennal organ absent; anal spines 3.

Friesea claviseta Axelson, 1900.

NEW MEXICO RECORDS. From Berlese of oak litter, 7,400 ft., Doc Long's Picnic Area, Sandia Mts., Bernalillo Co., 29–v–1951.

DISTRIBUTION. Iowa, N. M., N. Y., N. C., Europe.

Friesea pentacantha Mills, 1934.

NEW MEXICO RECORDS. From Berlese of rotted cottonwood stump, along Rio Grande, 4,100 ft., 12 mi. S of Hatch, Dona Ana Co., 27–xi–1949.

DISTRIBUTION. Iowa, N. M.

Genus **Xenyllodes** Axelson, 1903

Furcula present, not reaching collophore; eyes 5 and 5; postantennal organ with 3 lobes; anal horns 2.

Xenyllodes alpinus sp. nov. Figure 1.

TYPE LOCALITY. *Holotype* and 4 *paratypes* from base of Pecos Baldy Mt., Mora Co., NEW MEXICO; Berlese of bristlecone pine-spruce litter, 11,700 ft., 8–ix–1954.

DESCRIPTION. Body elongate, not subglobose; segmentation distinct, segments without ankylosis; integument tuberculate; clothed by short to moderately long setae; color white to pale yellow mottled with blue; intersegmental regions of abdomen without blue markings; legs and furcula pale; head prognathous; ratio of antenna to head as 12:13; postantennal organ present, with 3 tubercles; eyes 5 and 5 on dark eyepatches; mouthparts suctorial; tibiotarsus without distal subsegment;

claws tunicate; ratio of unguiculus III to ungius III as 1:4; unguiculus I and II rudimentary; one weakly knobbed tenent hair; unguis without true teeth, but with 3–4 rounded tuberculations; unguiculus without teeth; furcula not reaching collophore; mucro distinct from dens; mucro lamellate; anus terminal; anal spines 2, each one-half length of unguis III; body length 0.7 mm.

Discussion. *Xenyllodes alpinus* is differentiated from other known members of the genus by the following combination of characters: Integument tuberculate; postantennal organ with 3 tubercles; each foot with 1 weakly knobbed tenent hair; unguiculi I and II reduced; Abd V and VI not demarcated strongly from rest of body.

Xenyllodes hoffi, sp. nov. Figure 2.

Type Locality. *Holotype* and 10 *paratypes* from one-eighth mi. E of Cole Springs, Sandia Mts., Bernalillo Co., New Mexico; Berlese of acorn (oak) hulls, 7,400 ft., 21–vii–1951.

Description. Body elongate, not subglobose; segmentation distinct, segments without ankylosis; integument minutely granulate; clothed by short setae; orange with dark blue reticulations; intersegmental areas often with darker blue pigment; head prognathous; ratio of antenna to head as 14:15; postantennal organ with 4 peripheral tubercles; eyes 5 and 5 on dark eyepatches; mouthparts suctorial; tibiotarsus without distal subsegment; claws not tunicate; ratio of unguiculus to unguis as 5:8; tenent hairs 1; unguis with 1 tooth; unguiculus without teeth; furcula not ankylosed, reaching Abd III; manubrium to dens to mucro as 36:16:5; dental spines absent; dentes with dorsal crenulations; anus terminal; anal spines 2, each about 0.3 length of unguis III; Abd V and VI strongly demarcated from rest of body; body length 1.1 mm.

Discussion. It is with pleasure that I name this species for Dr. C. Clayton Hoff, Professor of Biology, University of New Mexico, whose diligent collecting made this study possible.

Xenyllodes hoffi is differentiated from other known members of the genus by the following combination of char-

acters: Integument minutely granulate; postantennal organ with 4 tubercles; each foot with 1 strongly knobbed tenent hair; unguiculi well developed; Abd V and VI demarcated strongly from rest of body.

Xenyllodes pallescens, sp. nov. Figure 3.

TYPE LOCALITY. *Holotype* and 9 *paratypes* from Mt. Withington, SW of Magdalena, Socorro Co., NEW MEXICO; Berlese of limber pine litter, 10,300 ft., 13–ix–1954.

DESCRIPTION. Body elongate, not subglobose; segmentation distinct, segments without ankylosis; integument minutely tuberculate; clothed by short setae; essentially white with extremely minute dark blue specks visible upon close examination; head prognathous; antenna subequal to head in length; postantennal organ with 3 tubercles; eyes 5 and 5 on gray eyepatches; mouthparts suctorial; claws tunicate, unguiculus minute; tenent hairs absent; unguis with 4 teeth; furcula not ankylosed, not reaching collophore; mucro lamellate; anus terminal; anal spines 2, each five-eighths length of unguis III; body length 0.5 mm.

DISCUSSION. *Xenyllodes pallescens* is differentiated from other known members of the genus by the following combination of characters: Integument minutely tuberculate; postantennal organ with 3 tubercles; tenent hairs absent; unguiculi well developed; Abd V and VI not demarcated strongly from rest of body.

Genus **Anurida** Laboulbene, 1865

Furcula absent; eyes 5 and 5 or absent; postantennal organ with 6–40 tubercles; anal spines absent.

Anurida violacea sp. nov. Figure 4.

TYPE LOCALITY. *Holotype* and 7 *paratypes* from Cedro Canyon, Manzano Mts., Bernalillo Co., NEW MEXICO; Berlese of oak-pinyon litter, 7,200 ft., 11–v–1952.

DESCRIPTION. Body elongate, not subglobose; segmentation distinct, segments without ankylosis; integument minutely tu-

berculate, clothed by short setae; violet with indistinct transverse black stripes laterally, and sharply defined transverse narrow black stripes at the posterior edge of Abd IV and V; head prognathous; ratio of antenna to head as 9:11; Ant III and IV semiconfluent; postantennal organ present, with 10–16 tubercles; eyes 5 and 5 on dark eyepatches; mouthparts suctorial, not projecting in a cone; tibiotarsus with distal subsegment; claws not tunicate; unguiculus absent; long terminal hair of tibiotarsus resembling tenent hair, but unknobbed; unguis with 1 tooth; furcula absent; anus terminal; anal spines absent; body length 0.8 mm.

Discussion. This species is quickly distinguished from other members of the genus by its beautiful violet color. Other distinctive features are the tubercles of the postantennal organ and the arrangement of ocelli.

Tribe *Neanurini* Borner, 1901

Anal segment large; supra-anal valve bilobed; segmental tubercles present; buccal cone present.

Genus **Neanura** MacGillivray, 1893

Maxilla head lance-like, without teeth or lamellae; Abd VI visible from above; postantennal organ usually absent, when present with more than 100 tubercles; unguiculus, furcula, and anal spines absent.

Neanura aurantiaca Caroli, 1910.

New Mexico Records. Berlese of rotten pine logs, 7,600 ft., La Cueva, Jemez Mts., Sandoval Co., 23–vii–1950.

Distribution. N. M., N. Y., Europe.

Neanura gigantea (Tullberg, 1876).

New Mexico Records. From beneath rocks, aspen gulley, 9,700 ft., along Hyde Park Road, NE of Santa Fe, Santa Fe Co., 28–vii–1953; and from Berlese of (1) aspen-fir litter, 9,700

ft., along Canjilon Road, at divide W of Vallecitos, Rio Arriba Co., 13–viii–1953, (2) aspen litter, 9,200 ft., SW of Santa Fe Ski Run, Santa Fe Co., 27–vii–1953.

DISTRIBUTION. Cal., N. M.

Neanura magna (MacGillivray, 1893).

NEW MEXICO RECORDS. From Berlese of rotted log and associated debris, fir community, 8,300 ft., Tejano Canyon, Sandia Mts., Bernalillo Co., 3–xi–1950.

DISTRIBUTION. N. M., Ohio.

Neanura muscorum form **muscorum** (Templeton, 1835).

NEW MEXICO RECORDS. Sandia Mts., Bernalillo Co., from Berlese of (1) rodent midden heap of fir cone scales, 10,300 ft., near Sandia Crest, date unknown; (2) fir-aspen litter, 9,200 ft., 14–vii–1951; (3) oak litter, 7,400 ft., Doc Long's Picnic Area, 29–v–1951.

DISTRIBUTION. Conn., Ill., Iowa, La., Maine, Minn., N. H., N. M., N. C., Ohio, Pa., Ontario (Canada), Mexico, Europe, Australasia.

Neanura muscorum form **persimilis** Mills 1934.

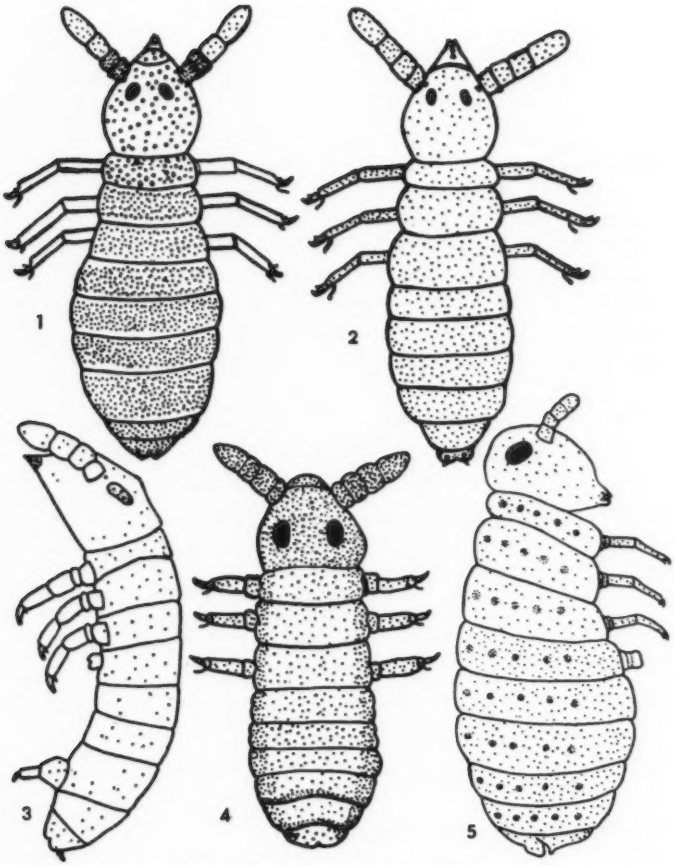
NEW MEXICO RECORDS. From Berlese of alder-fir litter, moist area along river, 7,800 ft., along N. M. Route 3, just E of Rio Pueblo, Taos Co., date unknown.

DISTRIBUTION. Iowa, N. M., N. C., Texas.

Neanura serrata Folsom, 1916.

NEW MEXICO RECORDS. From Berlese of (1) Gambel oak litter, 7,300 ft., S of Cebolla, N of Echo Amphitheatre, Rio Arriba Co., 3–ix–1952; (2) birch litter, 8,000 ft., Columbine Camp, W of Red River Village, Taos Co., 19–viii–1953; (3) aspen litter, 10,800 ft., Aspen Hill, near Santa Fe Ski Run, Santa Fe Co., 11–viii–1953.

DISTRIBUTION. N. M., Ore.



FIGURES: (1) *Xenyllodes alpinus* sp. nov., holotype, dorsal view; (2) *Xenyllodes hoffi* sp. nov., holotype, dorsal view; (3) *Xenyllodes pallescens* sp. nov., holotype, lateral view; (4) *Anurida violacea* sp. nov., holotype, dorsal view; (5) *Neanurodes neomexicanus* gen. et sp. nov., holotype, lateral view.

Genus **Neanurodes** gen. nov.

TYPE SPECIES. *Neanurodes neomexicanus* gen. et sp. nov.

DESCRIPTION. Body elongate, not subglobose; segmentation distinct; pronotum setaceous, not greatly reduced, of the same texture as the other segments; head prognathous; mouthparts suctorial; pseudocelli absent; anal spines absent, furcula present, anal segment moderately large; supra-anal valve bilobed; small segmental tubercles present; buccal cone present; maxilla head lance-like, without teeth or lamellae; Abd VI visible from above; postantennal organ present, with about 20 peripheral tubercles, eyes 8 and 8, tibiotarsus without distal subsegment.

DISCUSSION. This genus appears to be intermediate between the tribes Pseudachorutini and Neanurini, showing characteristics of both. The following key differentiates *Neanurodes* from other genera of Neanurini:

1. Maxilla head with teeth and lamellae.....2
   Maxilla head lance-like, without teeth or lamellae.....3
2. Abd VI visible dorsally.....**Protanura**
   Abd VI hidden dorsally by Abd V.....**Morulina**
3. Segmental tubercles large; postantennal organ usually absent, when present with more than 100 tubercles;.....**Neanura**
   Segmental tubercles small; postantennal organ present, with about 20 tubercles.....**Neanurodes** gen. nov.

Neanurodes neomexicanus gen. et sp. nov. Figure 5.

TYPE LOCALITY. Just N of Alameda, Bernalillo Co., NEW MEXICO; Berlese of cottonwood litter on sand, 5,000 ft., 2–vi–1954.

DESCRIPTION. Body elongate, not subglobose; segmentation distinct, segments without ankylosis; integument rough, with small intersegmental tubercles of the Neanurini type, but much smaller than those of any previously described species of that tribe; pale yellow marked uniformly with minute brown spots; eyespots, antennae, legs and furcula violet-brown; clothed by short setae; head prognathous; antenna short and stubby, ratio of antenna to head as 6:11; ratio of antennal segment 7:6:10:10; Ant III and IV semiconfluent; postantennal organ present,

with about 20 peripheral tubercles; eyes 8 and 8; mouthparts suctorial with a buccal cone; tibiotarsus without distal subsegment; furcula present, short, well developed; anus terminal; anal spines absent; supra-anal valve bilobed; length 0..9 mm.

Summary

Record is made of 13 species of neanurine Collembola from New Mexico: *Pseudachorutes aureofasciatus, P. subcrassoides, Friesea claviseta, F. pentacantha, Xenyllodes alpinus* sp. nov., *X. hoffi* sp. nov., *X. pallescens* sp. nov., *Anurida violacea* sp. nov., *Neanura aurantiaca, N. gigantea, N. magna, N. muscorum,* and *Neanurodes neomexicanus* gen. et sp. nov. All species are new records for the state. Ecological data are presented for each species.

References Cited

Axelson, W. M. 1900. Medd. Soc. Fauna Flora Fennica, *26*: 105–123.
——. 1903. Acta. Soc. Fauna Flora Fennica, 25(7): 1–13.
Borner, C. 1901. Zool. Anz., 24: 422–423.
——. 1906. Hamburg, Jahrb. Wiss. Anst., 23: 147–186.
Caroli, E. 1910. Mon. Zool. ital. Firenze, 21: 321–322.
Dalla Torre, K. W. 1895. Prog. Staats-Gym. Innsbruck, 24: 1–23.
Folsom, J. W. 1916. Proc. U. S. Natl. Mus., 50: 477–525.
Harvey, F. L. 1898. Ent. News, 9(9): 216–217.
Laboulbene, A. 1865. Ann. Soc. Ent. France, ser. 4, 4: 705–720.
MacGillivary, A. D. 1893. Canadian Ent., 25(12): 313–318.
Mills, H. B. 1934. A monograph of the Collembola of Iowa. Ames: Collegiate Press, pp. xii + 143.
Templeton, R. 1835. Trans. Ent. Soc. London, 1(2): 89–98.
Tullberg, T. 1871. Ofv. Kgl. Vet.-Akad. Forhandl., 28(1): 143–155.
——. 1876. *Ibid.*, 33(5): 23–42.

Obituary

Dr. August Thienemann, Director Emeritus of the Hydrobiologische Anstalt of the Max Planck Gesellschaft, died April 22, 1960. Professor Thienemann had directed the work of the Institute for 40 years and is considered the father of modern limnology.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Butterflies. Wish to exchange specimens for Japanese species. Please write to Ichiro Nakamura (Boy, age 16), 26 Aza-Nichiyama Obayashi Takarazuka-shi, Hyogo-Ken, Japan.

Phasmidae of nearctic area desired alive. Purchase or trade, drawing on large stock of major orders, worldwide. Domminck J. Pirone, Dept. Entomology, Cornell University, Ithaca, N. Y.

Nitidulidae and Rhizophagidae wanted in exchange for European beetles of all families. O. Marek, Zămberk 797, Czechoslovakia.

Wanted and Needed. We are compiling a history of entomology, and particularly, at present, of the amateur insect clubs that flourished 50 to 75 years ago. Will you who have knowledge of such early clubs or societies advise me, giving facts on the time of existence, members, etc., which you may have. J. J. Davis, Dept. of Entomology, Purdue University, Lafayette, Indiana.

Cockroaches (Blattoidea) of Japan, Okinawa, Formosa (Taiwan), and the Philippines are being studied in cooperation with Dr. K. Princis. Loans of specimens from that area are desired. A. B. Gurney, U. S. National Museum, Washington 25, D. C.

Orthoptera. Gryllinae (except domestic sp.) and **Pyrgomorphinae** of the world wanted in any quantity for work in morphology, taxonomy, cytology, and experimental biology; dry, or in fluid, or living. Write D. K. Kevan and R. S. Bigelow, Dept. of Entomology, McGill University, Macdonald College, Quebec, Canada.

Important Mosquito Works

MOSQUITO ATLAS. Part I. The Nearctic Anopheles, important malarial vectors of the Americas, and Aedes aegypti and Culex quinquefasciata

MOSQUITO ATLAS. Part II. The more important malaria vectors of the Old World: Europe, Asia, Africa and South Pacific region

By Edward S. Ross and H. Radclyffe Roberts

Price, 60 cents each (U. S. Currency) with order, postpaid within the United States; 65 cents, foreign.

KEYS TO THE ANOPHELINE MOSQUITOES OF THE WORLD

With notes on their Identification, Distribution, Biology and Relation to Malaria. By Paul F. Russell, Lloyd E. Rozeboom and Alan Stone

Mailed on receipt of price, $2.00 U. S. Currency. Foreign Delivery $2.10.

For sale by the American Entomological Society, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

Just Published

New Classified Price Lists

Available separates from the TRANSACTIONS OF THE AMERICAN ENTOMOLOGICAL SOCIETY and ENTOMOLOGICAL NEWS, and all titles of the Society's MEMOIRS have been catalogued by author in twelve special price lists in the following categories:

Coleoptera	**Neuroptera and Smaller Orders**
Diptera	**Odonata**
Hemiptera	**Orthoptera-Dermaptera**
Hymenoptera	**Arachnida and Other Classes**
Lepidoptera	**Bibliography-Biography**
Memoirs	**General**

Lists will be mailed free upon request. Please state specifically which list or lists you require.

The American Entomological Society
1900 RACE STREET
PHILADELPHIA 3, PENNSYLVANIA

Just Published

MEMOIRS OF THE AMERICAN ENTOMOLOGICAL SOCIETY

Number 17

A TAXONOMIC STUDY OF THE MILLIPED FAMILY SPIROBOLIDAE (DIPLOPODA: SPIROBOLIDA)

By William T. Keeton

147 pages of text, 37 tables, 2 maps, 18 plates, table of contents and index

Spirobolid millipeds are probably the most widely known Diplopoda in the United States, being used in many college courses; yet the family has been little studied. This monograph brings together existing knowledge of the group for the first time, and adds much new information gained from critical study of series. The taxonomic history of the family is outlined. External morphology is briefly treated, with emphasis on characters utilized in classification. A summary of current knowledge of life histories is included. The family is redefined, and each genus and species is treated in detail. Particular attention is given to variation and distribution, both of which become more meaningful biologically as a result of synonymizing many species names. Possible phylogenetic relationships of the genera are discussed, and keys to all taxa are provided, with most diagnostic characters illustrated in 18 plates or summarized in 37 tables.

Price $5.50

THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 Race Street, Philadelphia 3, Penna., U.S.A.